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SUBJECT: US-USSR ENVIRONMENTAL AGREEMENT: PROJECT 02.07-21,
COMPREHENSIVE ANALYSIS OF THE ENVIRONMENT; TASHKENT SYMPOSIUM,
OCTOBER 1977

1. REQUEST EMBASSY PASS FOLLOWING LETTER TO DR. L. M.
FILIPPOVA OF INSTITUTE OF APPLIED GEOPHYSICS, MOSCOW, WITH
COPY TO KAZAKOV.

2. MARCH 14, 1978 02.07-21

DR. L. M. FILIPPOVA
CHIEF OF DEPARTMENT
INSTITUTE OF APPLIED GEOPHYSICS
GLEBOVSKAYA ULITSA, 20B
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PAGE 02 STATE 066330

MOSCOW

DEAR DR. FILIPPOVA:

THE FOLLOWING IS THE SUMMARY YOU REQUESTED OF THE PRESENTA-
TION MADE BY DR. RALPH C. D'ARGE AT THE TASHKENT SYMPOSIUM.
IF YOU HAVE ANY QUESTIONS OR FURTHER COMMENTS, PLEASE LET US

KNOW.

ABSTRACT

MODELS OF ECONOMIC GROWTH AND THE ENVIRONMENT

RALPH C. D'ARGE, UNIVERSITY OF WYOMING, UNITED STATES

IN RECENT YEARS THERE HAS BEEN SUBSTANTIAL RESEARCH ACTIVITY BY ECONOMISTS IN THE WESTERN WORLD TO RECONCILE CONCEPTS OF TRADITIONAL ECONOMIC GROWTH AND GENERAL EQUILIBRIUM WITH PHYSICAL LAWS AND NATURAL PROCESSES OCCURRING IN THE ENVIRONMENT. IN THIS PRESENTATION THREE MODELS WERE DEVELOPED, EXAMINING FIRST WHAT ROLE CONSERVATION OF MATTER AND ENERGY PLAYS IN ECONOMIC THEORY AND HOW IT MAY ALTER TRADITIONAL ECONOMIC MODELS OF PLANNING; SECOND, DESCRIBING HOW FINITE NATURAL RESOURCES AND FINITE ASSIMILATIVE CAPACITIES OF THE ENVIRONMENT RESTRICT TRADITIONAL MODELS OF ECONOMIC GROWTH; AND THIRD, EXAMINING HOW ENTROPY MIGHT ENTER AS A CONSTRAINT IN ECONOMIC PLANNING MODELS. IT WAS SHOWN THAT TRADITIONAL MICROECONOMIC MODELS ARE NOT ENTIRELY CONSISTENT WITH EITHER THE FIRST OR SECOND LAWS OF THERMODYNAMICS. IT WAS ALSO SHOWN THAT THE MAPPING BETWEEN ATOMISTIC COMPETITION AND EFFICIENCY IS BROKEN ENTIRELY WHEN THE FIRST LAW OF CONSERVATION OF MATTER AND ENERGY IS TAKEN INTO ACCOUNT. FURTHER, IT WAS DEMONSTRATED UNDER RATHER GENERAL ASSUMPTIONS THAT CONSUMPTION PER CAPITA MAY INCREASE OR DECREASE BUT IS UNLIKELY TO REMAIN CONSTANT FOR ANY OPTIMAL STRATEGY OF UNCLASSIFIED

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PAGE 03 STATE 066330

DEVELOPMENT. IT WAS ALSO DEMONSTRATED THAT THE PURE THEORY OF EXHAUSTION OF RESOURCES IS COMPLEMENTAL TO A PURE THEORY OF ENVIRONMENTAL POLICY. FINALLY, IT WAS CONJECTURED THAT A SYMMETRY EXISTS AS TO THE EFFECTS OF BOTH THE FIRST AND SECOND LAWS ON ECONOMIC MODELS AND THAT BOTH ARE A FORM OF CONSTRAINT THAT ELICIT WELL-DEFINED SHADOW PRICES.

SINCERELY,

ELAINE M. FITZBACK

SOVIET PROGRAM COORDINATOR

OFFICE OF RESEARCH AND DEVELOPMENT VANCE

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